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10/801,928	03/16/2004	Horacio D. Espinosa	NU23104	2330
7590 07/24/2006			EXAMINER	
Mr. Edward J. Timmer P.O. Box 770 Richland, MI 49083-0770			LARKIN, DANIEL SEAN	
			ART UNIT	PAPER NUMBER
			2856	

DATE MAILED: 07/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/801,928

Applicant(s)

ESPINOSA ET AL.

Examiner

Daniel S. Larkin

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 May 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) 19-55 and 58 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 56 is/are allowed.
- 6) ☒ Claim(s) 1-7, 11, 12 and 14-18 is/are rejected.
- 7) ☒ Claim(s) 8-10, 13 and 57 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>30 July 2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 1-18, 56, and 57, in the reply filed on 15 May 2006 is acknowledged.
2. Claims 19-55 and 58 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 15 May 2006.

### ***Drawings***

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

Reference numeral -- 100 -- does not appear within Figure 1, as suggested by the disclosure on page 6, line 25.

Reference numerals -- 104a -- and -- 104b -- do not appear within Figures 4A, 4B, 5, and 6, as suggested by the disclosure on page 7, line 27.

Reference numerals -- 104c -- does not appear within Figures 4A, 4B, 5, and 6, as suggested by the disclosure on page 7, line 28.

Reference numeral -- 100 -- does not appear within Figure 3A, as suggested by the disclosure on page 12, line 7.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "112a" and "112b", as shown in Figure 6, and "104a" and "104b", as shown in Figures 8E, 9A, 9B, 13A, 14A, 14B, have both been used to designate "channel regions"/"microchannel regions" of the microchannel (104).

5. The drawings are objected to because of the following:

The lead lines defining the inner and outer boundaries of the layers, as shown in Figures 9A-9C and 13A-13D should be deleted. It is clear from the shading of the layer the area and boundaries encompassed by the layers. Applicants should only use single lead lines to identify the relevant structure with its numerical identifier.

The diagonal line just to the right of second thin film 132 should also be deleted since it is clear that the space between film layer 130 and 134 is identified with numerals 104a and 104b.

Reference numeral "132", as shown in Figure 3A should be corrected to read -- 134 -- since the disclosure, page 11, lines 15-24, discloses that the second film layer (132) of silicon oxide is removed by hydrofluoric solution to create the volcano-shaped microtip (106), as shown in Figure 8H; and Figure 3A appears to represent the final form of the dispensing microtip.

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6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

Reference numerals "140a" and "140b", as shown in Figure 8E, do not appear within the written specification.

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "200" has been used to designate both a "masking layer", as shown in Figure 15A and disclosed on page 15, line 2, and a "dispensing device", as shown in Figure 17 and disclosed on page 18, lines 16, 19, 24, and 25.

8. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet

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submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

9. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

10. The disclosure is objected to because of the following informalities:

Page 7, line 11: The phrase "is communicated" should be corrected to read -- communicates with --.

Page 7, line 13: The phrase "is communicated to" should be corrected to read -- communicates with --.

Page 7, lines 14 and 15: The phrase "be communicated to" should be corrected to read -- communicate with --.

Page 7, line 27: Reference numerals "104a" and "104b" should be corrected to read -- 112a -- and -- 112b --, since the channel regions have been previously represented by reference numerals 112a and 112b.

Page 7, line 28: Reference numeral "104c" should be corrected to read -- 112c --.

Page 8, line 1: The numerals "4" and "7" should be corrected to read -- four -- and -- seven --, respectively.

Page 8, line 2: The phrase "3-5" should be corrected to read -- three to five --, respectively.

Page 10, line 24: Reference numerals "104a" and "104b" should be corrected to read -- 112a -- and -- 112b --, since the channel regions have been previously represented by reference numerals 112a and 112b.

Page 11, line 5: The term -- in -- should be inserted prior to the term "Figure".

Page 11, line 6: Reference numerals "104a" and "104b" should be corrected to read -- 112a -- and -- 112b --, since the channel regions have been previously represented by reference numerals 112a and 112b.

Page 11, line 8: One "period" should be deleted.

Page 11, line 13: A -- comma -- should be inserted after the term "Then".

Page 11, line 14: A -- comma -- should be inserted after the term "layer"; and the verb "are" should be corrected to read -- is --.

Page 12, line 2: A space should be inserted between the abbreviation "Vol." and the numeral "3".

Page 12, line 12: The numerals "4" and "10" should be corrected to read -- four -- and -- ten --, respectively.

Page 12, line 16: The numeral "3" should be corrected to read -- three --.

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Page 12, line 17: The numeral "5" should be corrected to read -- five --.

Page 12, line 24: The term "Figures" should be corrected to read -- Figure --.

Page 12, line 25: The term "Figure" should be corrected to read -- Figures --.

Page 12, line 27: Both occurrences of the term "Figure" should be corrected to read -- Figures --.

Page 12, line 29: The numeral "1" should be corrected to read -- one --.

Page 13, line 1: The term -- Figure -- should be inserted prior to the designation "12B".

Page 13, lines 4 and 14: Reference numerals "104a" and "104b" should be corrected to read -- 112a -- and -- 112b --, since the channel regions have been previously represented by reference numerals 112a and 112b.

Page 13, line 11: The space between the term "region" and the letter "s" should be deleted.

Page 13, line 23: The article -- the -- should be inserted prior to the term "etching".

Page 13, line 24: Either the term "of" or the term "showing" should be deleted.

Page 13, lines 26 and 27: Either the term "of" or the term "showing" should be deleted.

Page 13, lines 28 and 29: Either the term "of" or the term "showing" should be deleted.

Page 14, line 1: The term "Figure" should be corrected to read -- Figures --; and the verb "is" should be corrected to read -- are --.



Page 14, lines 4 and 22: Reference numerals "104a" and "104b" should be corrected to read -- 112a -- and -- 112b --, since the channel regions have been previously represented by reference numerals 112a and 112b.

Page 14, lines 11 and 12: The phrase "to, Figure 14A" should be corrected to read -- , as shown in Figure 14A, to --.

Page 14, line 22: Either the term "of" or the term "showing" should be deleted.

Page 14, line 25: The term "Figure" should be corrected to read -- Figures --.

Page 15, line 8: A -- comma -- should be inserted prior to the term "such".

Page 15, line 9: A -- comma -- should be inserted prior to the conjunction "and".

Page 15, line 10: A -- comma -- should be inserted prior to the terms "such" and "are".

Page 15 line 12: The "period" should be deleted.

Page 15, line 19: A -- comma -- should be inserted prior to the term "such".

Page 15, line 20: A -- comma -- should be inserted after the term "oxide".

Page 15, line 21: A -- comma -- should be inserted after the term "nitride" and the designation "15I".

Page 15, line 24: The term "Figure" should be corrected to read -- Figures --.

Page 16, line 23: The term "Figure" should be corrected to read -- Figures --.

Page 16, line 30: A -- comma -- should be inserted prior to the term "such"; and the first occurrence of the "period" should be replaced with a -- comma --.

Page 17, line 3: The space between the term "substrate" and the "comma" should be deleted.

Page 17, line 25: The article -- an -- should be inserted prior to the term "embodiment".

Page 17, line 27: A -- comma -- should be inserted prior to the term "such".

Page 17, line 28: The article -- a -- should be inserted prior to the term "thermal".

Page 18, line 11: A -- comma -- should be inserted after the terms "controller" and "shown".

Page 18, lines 16, 19, 24, and 25: Reference numeral "200" has been previously used to identify a "masking layer" as disclosed on page 15, line 2.

Page 19, line 28: A space should be inserted between the "period" and the article "The".

Page 20, line 5: The term "form" should be corrected to read -- from --.  
Appropriate correction is required.

### ***Claim Objections***

11. Claims 1-18 and 57 are objected to because of the following informalities:

Re claim 1, claim line 4: The term -- cantilever -- has been misspelled; and the phrase "communicated to" should be corrected to read -- communicating with --.

Re claim 2, claim line 1: A space should be inserted between the term "claim" and the numeral "1".

Re claim 5, claim line 2: The term "stress" should be corrected to read -- stresses --.

Re claim 6, claim line 1: The phrase "is communicated to" should be corrected to read -- communicates with --.

Re claim 12, line 12: The numerals "4" and "10" should be corrected to read -- four -- and -- ten --, respectively.

Re claim 13, line 1: The numeral "3" should be corrected to read -- three --.

Re claim 13, line 2: The numeral "5" should be corrected to read -- five --.

Re claim 57, claim line 2: The term "to" should be corrected to read -- with --.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

13. Claims 1-7, 11, and 15-18 are rejected under 35 U.S.C. 102(e) as being anticipated by US 2006/0057031 (Hantschel et al.).

With respect to the limitations of claim 1, the reference to Hantschel et al. discloses a capillary-channel probe, comprising: an elongated cantilever/spring beam (460) comprising a plurality of thin films (465, 466, 461) arranged relative to one another to define a microchannel (467) in the cantilever (460), the cantilever (460) having a

material dispensing tip (455) proximate an end of the cantilever and communicated to the microchannel to receive material therefrom.

With respect to the limitation of claim 2, the reference to Hantschel et al. appears to show, as shown in Figure 4(I), that the microchannel (467) is defined between a pair of thin films.

With respect to the limitation of claim 3, the reference to Hantschel et al. discloses the use of a protective coating (461) over any exposed portions of the cantilever/spring beam (460) and microchannel/channel structure (467), as shown in Figure 4(I) and page 6, paragraph [0052], lines 1-5.

With respect to the limitation of claim 4, the reference to Hantschel et al. discloses that the outmost edges of the thin films include an angled region extending from a respective planar film region and wherein the sealing layer fills any gaps between the thin films at the angled regions, as shown and discussed with respect to Figures 4(H) and 4(I).

With respect to the limitation of claim 5, the reference to Hantschel et al. discloses that one of the films (465) includes one or more metals for forming a spring structure, paragraph [0038], lines 16-20. Each of these material components would inherent have different residual stress values.

With respect to the limitation of claim 6, the reference to Hantschel et al. discloses that the microchannel communicates with a material containing reservoir (520 or 443), as shown in Figures 5(C) or 4(I), see page 4, paragraph [0040], lines 15,19 or page 6, paragraph [0051], lines 1-16.

With respect to the limitation of claim 7, the reference to Hantschel et al. discloses a reservoir (443) provided on the substrate and the cantilever extending from the substrate, as shown in Figure 4(I).

With respect to the limitation of claim 11, the reference to Hantschel et al. discloses that one of the thin films (465) is connected to a semiconductor chip substrate (440).

With respect to the limitation of claim 15, the reference to Hantschel et al. discloses, as shown in Figure 8(G), a microchannel having first and second side-by-side channel regions (469B, 469C) separated by a wall (467(9)-C and 467(9)-G), wherein the channel regions terminate in a common arcuate channel region (468(9)) extending partially about the dispensing tip.

With respect to the limitations of claims 16 and 17, the reference to Hantschel et al. discloses the use of an actuator (495) on the cantilever to impart bending motion thereto, pages 6 and 7, paragraphs [0053-0055].

With respect to the limitations of claim 18, the reference to Hantschel et al. discloses a plurality of cantilevers/spring beams (350A) in an array formation, as shown in Figure 3(A).

### ***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2006/0057031 (Hantschel et al.) in view of In re Yount.

With respect to the limitations of claims 12 and 14, the reference to Hantschel et al. fails to expressly disclose the specifics of the width, height, and length of the cantilever/spring beam (460). The reference to Hantschel et al., however, discloses that the width of the microchannel is one micrometer. It is the examiner's position that identifying the proper size, width, and length of a cantilever through routine experimentation would be within the requisite ability of one of ordinary skill in the art given the teachings set forth in Hantschel et al. and in light of the fact that the courts have ruled that changing the size of an article is not ordinarily a matter of invention, In re Yount, 36 C.C.P.A. (Patents) 775, 171 F.2d 317, 80 USPQ 141. The reference to Hantschel et al. teaches a microarray system for dispensing fluids comprising very small cantilevers; and applicants' disclosure fails to assert any criticality as it relates to the specific size, height, and length of cantilevers used in the invention.

#### ***Allowable Subject Matter***

16. The following is a statement of reasons for the indication of allowable subject matter:

Prior art was not relied upon to reject claims 8-10, 13, 56, and 57 because the prior art fails to teach and/or make obvious the following limitations:

Claims 8-10 and 13: Providing a material dispensing device comprising a cantilever having a plurality of thin films relative to one another to define a microchannel; and a material dispensing tip communicating with the microchannel, wherein the dispensing tip comprises a pointed tip body and an annular shell comprising one of the thin films spaced about the tip body to define a material dispensing annular space about the tip body in combination with all of the limitations of the base claim.

Claims 56 and 57: Providing a material dispensing device comprising a cantilever comprising first, second, and third films; and a material dispensing tip being defined between a pointed tip body on a substrate and the third thin film in combination with all of the remaining limitations of the claim.

### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The prior art to US 7,034,854 (Cruchon-Dupeyrat et al.) discloses an ink delivery system, as shown in Figure 8, comprising a cantilever having a microchannel formed therein and a tip arranged at an end of the cantilever communicating with the microchannel, see col. 17, lines 8-50 and embodiments 85 and 86 (cols. 30 and 31).

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel S. Larkin whose telephone number is 571-272-2198. The examiner can normally be reached on 8:00 AM - 5:00 PM Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Daniel Larkin  
AU 2856  
19 July 2006

  
**DANIEL S. LARKIN**  
**PRIMARY EXAMINER**